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Some further Remarks on the Instrument proposed by an Anonymous French Author, for effecting a perpetual Motion, an account whereof is given in No. 177 of these Transactions, by Dr. Papin.
M. D: R. S. S.

HAVING seen in the *Journal des Scavans* of May 13th. and in the *Nouvelles de la Republique des Letres* of the Month of June, that the Author of the perpetual Motion is not satisfied, but doth endeavour to answer the Objection that I propounded against his contrivance, in the Philosophical Transactions of the Month of December, 1685. I find I must explain my self more at large than I did in that Paper; but I begg his pardon if I say nothing concerning the new disposition, which he says might be given to his Engine: My want of time makes me avoid new matters of dispute, and I think it enough for me, if I do but shew that his first Description can never succeed.

I am very sorry, that this Author took so much trouble in trying his Bellows with several Liquors, as Oyl, Mercury, Water. I thought I had said nothing, that might make him believe, that I did in the least question the truth, which he intended to prove against me by those Experiments, and without any tryals I am fully enough convinced that the Mercury in his Engine must follow the laws of the *æquilibrium* of fluid Bodies: But the consequence which he draws from that Principle, seems to be very groundless; for altho' the lowermost part of the Bellows be press'd by the weight of 40 inches of Mercury, it doth not follow, that all the parts which are situated higher must bare the same pressure: To the quite contrary, it is plain that the upper part having no Mercury above its bears none at all; the parts that lye in the middle near the *Axes* of the Bellows, bear but 20 inches, and so all the rest must bear more or less, according as they lye higher or lower: It is evident therefore, that there are

as many parts that bear less than 20 inches, as there are that bear more, and the increase of pressure following an Arithmetical Progression, it is undeniable, that all these pressures added together, will do no more than one uniform pressure, that would be equal to 20 inches every where.

Having thus found the quantity of pressure caused by the *Mercury* within the Bellows, we must remember that the pressure of the *Atmosphere* within the same Bellows, is equivalent but to 5 inches, as I observed in my first Paper *vid.* Philosophical Transaction No 177 pag. 1241: So that we find that the inward pressure is equivalent but to 25 inches of *Mercury* in all. Now the pressure of the *Atmosphere* upon the outside is every where equal to 27 inches; from whence it appears that the pressure without is stronger than the pressure within, and so I had reason to say, that the Bellows standing upright, must rather shut than open.

I did not think to have given this Computation so at large, but I have been necessitated to do it (as I said in the beginning) since my first Paper was not sufficient to make me be understood by the Author of the Perpetual Motion, however, I will be careful to save the time of the Reader as much as I can; and although I might observe some other things in his Description, that will increase the difficulty of opening the Bellows, I forbore to speak of them; and I will stick only to that which is most material, and makes his perpetual Motion to be altogether impossible.

As for the Argument the Author draws from comparing his Engine to an ordinary *Siphon*; I do beseech him to consider what a difference there is between a *Siphon* that lets the water run down at the bottom, and his Engine; that should gather up the heavy liquor into the highest part of the Instrument, and I do not question but he will acknowledge the weakness of this Argument.